

LISTING OF THE CLAIMS

This listing of claims, amended as indicated below, will replace all prior versions, and listings, of claims in the application

Claims 1-34: (Canceled).

35. (Currently Amended) A sprinkler assembly for receiving a supply of water and directing water therefrom, comprising:

 a nozzle housing having a flow path therein for water received in the sprinkler assembly, the flow path having a main portion extending along a central axis of the nozzle housing and an angled portion defining a water stream outlet passage through which water flowing in the flow path exits the sprinkler assembly;

 a nozzle removably mounted in the outlet passage for distributing water from the sprinkler assembly; and

 a valve including a substantially conical valve element rotatably mounted at a fixed axial position in the nozzle housing flow path;

a single opening in a conical wall of the conical valve element,

the single opening being movable into and out of the nozzle housing flow path by wherein rotation of the valve element between open and closed positions controls to control water flow to the angled portion of the nozzle housing flow path.

36. (Previously Presented) The sprinkler assembly according to claim 35, further including an actuator by which the valve element can be moved between the open and closed positions from the exterior of the nozzle housing.

37-39. (Canceled)

40. (Previously Presented) The sprinkler assembly according to claim 35, further comprising an indicator provided on the nozzle housing for indicating a position of the valve element.

41-46. (Canceled)

47. (Previously Presented) The sprinkler assembly according to claim 35, wherein the valve element is rotatable around the central axis of the nozzle housing.

48. (Currently Amended) A sprinkler assembly for receiving a supply of water and directing water therefrom, comprising:

a nozzle housing having a central axis and a flow path therein for water received in the sprinkler assembly,

the flow path having a main portion extending along the central axis of the nozzle housing and an angled portion defining a water stream outlet passage through which water flowing through the flow path exits the sprinkler assembly;

a nozzle removably mounted in the outlet passage for distributing water from the sprinkler assembly; and

a valve disposed in the nozzle housing having a single opening positionable between the main and angled portions of the nozzle housing flow path by operation of the valve which is operable between open and closed positions to control water flow between the main and angled portions of the nozzle housing flow path,

the valve being so constructed and configured that the parts thereof which are in the water flow path provide a single angular transition between the main and angled portions of the flow path when the valve is in a fully open position.

49. (Previously presented) The sprinkler assembly according to claim 48, further including an actuator by which the valve can be operated from the exterior of the nozzle housing.

50-59. (Canceled)

60. (Previously presented) The sprinkler assembly according to claim 48, wherein the valve is rotatable around the central axis of the nozzle housing.

61-63. (Canceled)

64. (Previously Presented) The sprinkler assembly according to claim 35, wherein the valve is so constructed and configured that the parts thereof which control water flow when the valve is not in an open position cause substantially no obstruction in the nozzle flow path when the valve is fully open.

65. (Previously Presented) The sprinkler assembly according to claim 35, wherein the valve is so constructed and configured that the parts thereof which control the water flow cause substantially no turbulence in the nozzle flow path when the valve is fully open.

66. (Canceled)

67. (Currently Amended) A sprinkler assembly for receiving a supply of water and directing water therefrom, comprising:

a nozzle housing having a main flow path formed therein for directing a flow of water received in the sprinkler assembly and a water stream outlet flow path through which water flowing through the main flow path exits the sprinkler assembly;

a transition portion between the main flow path and the stream outlet flow path;

a nozzle removably mounted in the stream outlet flow path for distributing water from the sprinkler assembly; and

a valve disposed in the nozzle housing upstream of the nozzle for throttling or shutting off flow to said nozzle,

the valve having a moveable valve element which is independent from other functional elements movable within the nozzle housing between open and closed positions to control water flow to the nozzle;

a single opening in the valve element positionable to provide water flow between the main flow path and the stream outlet flow path when the valve element is in the open position,

wherein a downstream end of the transition portion, an upstream end of the stream outlet flow path, and [[an]] the single opening in the valve element are all substantially aligned when the valve element is in the open position.

68. (Previously Presented) The sprinkler assembly according to claim 67, wherein the valve is a sleeve type valve in which the movable valve element forms the sleeve.

69. (Previously Presented) The sprinkler assembly according to claim 68, wherein: the valve is a sleeve valve; and the valve is so constructed and configured that the water flowing to the nozzle experiences substantially no obstruction or turbulence at an interface between the downstream end of the transition portion and the opening in the valve element when the valve is fully open.

70. (Currently Amended) The sprinkler assembly according to claim 67, wherein the movable valve element surrounds the transition [[area]] portion, and intersects the downstream end thereof.

71. (Previously Presented) The sprinkler assembly according to claim 70, wherein the valve element is conically-shaped.

72. (Previously Presented) The sprinkler assembly according to claim 67, further comprising an indicator provided on the nozzle housing for indicating at least an opened or closed state of the valve element.

73. (Previously Presented) The sprinkler assembly according to claim 67, further comprising: a flow throttle and shut off controller including a gear, and a rotatable actuator coupled to the gear; and

wherein the valve element includes gear teeth around a circumference thereof which cooperate with the controller gear to move the valve element between the open position and the closed position when the actuator is rotated.

74. (Previously Presented) The sprinkler assembly according to claim 73, wherein the actuator is manually rotatable from the exterior of the nozzle housing.

75. (Previously Presented) The sprinkler assembly according to claim 67, wherein the valve element is conically-shaped.

76. (Previously Presented) The sprinkler assembly according to claim 67, wherein the valve is so constructed and configured that the parts thereof which control the flow when the valve is not in the fully open position are substantially completely displaced from the nozzle flow path when the valve is fully open.

77. (Previously Presented) The sprinkler assembly of claim 67, further including:
a rotary drive mechanism for the nozzle housing;
a manually adjustable arc setting mechanism for setting an arc of coverage for the sprinkler;
an actuator for moving the valve element between the open and closed positions,
the actuator being so constructed that moving the valve element does not disturb an existing arc setting.

78. (Previously Presented) The sprinkler assembly of claim 77, further including:
a controller for moving the valve element, wherein the controller includes a gear, and a rotatable actuator coupled to the gear; and
wherein the valve element includes gear teeth around a circumference thereof which cooperate with the controller gear to move the valve element between the open position and the closed position when the actuator is rotated.

79. (Previously Presented) The sprinkler assembly according of claim 78, wherein the actuator is manually rotatable from the exterior of the nozzle housing.

80. (Previously Presented) The sprinkler assembly of claim 79, wherein the actuator is radially offset from a central axis of the nozzle housing.

81. (Previously Presented) The sprinkler assembly of claim 67, further including an actuator coupled to the valve element, the actuator being accessible from the exterior of the nozzle housing and manually operable to move the valve element between the open and closed positions.

82. (Previously Presented) The sprinkler assembly of claim 81, wherein the actuator is radially offset from a central axis of the nozzle housing.

83. (Previously Presented) The sprinkler assembly of claim 81, wherein the valve element is conically shaped and has the opening in the conical surface thereof, the valve element being rotatable by the actuator to align the axis of the opening with the water stream outlet flow path when the valve is in the open position.

84. (Previously Presented) The sprinkler assembly of claim 81, wherein the valve element is rotatable by the actuator to align the opening with the water stream outlet flow path when the valve is in the open position.

85. (Previously Presented) The sprinkler assembly according to claim 35, further including a transition portion having an upstream end opening which is substantially coaxial with the main portion of the nozzle housing flow path, and a downstream end opening which is substantially coaxial with the angled portion of the nozzle housing flow path; the valve element including an outlet opening which is movable between the open and closed positions to control water flow between the main and angled portions of the nozzle housing flow path.

86. (Previously Presented) The sprinkler assembly of claim 85, wherein the valve element is rotatably mounted in the nozzle housing to provide a sealing relationship with the water stream outlet.

87. (Previously Presented) The sprinkler assembly of claim 85, wherein the outlet opening of the valve element comprises an opening in the conical surface, and the valve element is rotatable around the central axis of the nozzle housing to align the opening with the angled portion when the valve is in the open position.

88. (Previously Presented) The sprinkler assembly of claim 85, further including an elbow-shaped transition portion between the main portion of the nozzle housing flow path and the angled portion of the nozzle housing flow path.

89. (Previously Presented) The sprinkler assembly of claim 88, wherein the conical valve element surrounds the elbow-shaped transition portion, and the opening in the conical portion is aligned with a downstream end opening in the transition portion when the valve is in the open position.

90. (Previously Presented) The sprinkler assembly of claim 89, wherein the conical valve element is movable relative to the elbow-shaped transition portion to open and close the valve.

91. (Previously Presented) The sprinkler assembly of claim 88, wherein an opening in the conical valve element provides communication between a downstream end of the transition portion and the angled portion of the flow path when the valve element is not in the closed position.

92. (Previously Presented) The sprinkler assembly of claim 87, further including an actuator coupled to the valve element, the actuator being accessible from the exterior of the nozzle housing and manually operable to rotate the valve element between the open and closed positions.

93. (Previously Presented) The sprinkler assembly of claim 92, wherein the valve element is rotatable by the actuator to align the opening in the valve element with the angled portion of the water stream outlet when the valve is in the open position.

94. (Previously Presented) The sprinkler assembly of claim 93, wherein the actuator is radially offset from a central axis of the nozzle housing.

95. (Previously Presented) The sprinkler assembly of claim 35, further including an opening in a conical surface of the valve element which allows water to flow to the angled portion of the nozzle housing flow path when the valve element is in the open position.

96. (Previously Presented) The sprinkler assembly of claim 95, further including:
a transition portion; and
wherein an opening in the conical valve element provides communication between a downstream end of the transition portion and the angled portion of the flow path when the valve element is not in the closed position.

97. (Previously Presented) The sprinkler assembly of claim 95, wherein the conical surface is oriented perpendicular to a longitudinal axis of the angled portion of the nozzle housing flow path whereby the axis of the opening is aligned with longitudinal axis of the angled portion of the nozzle housing flow path when the valve is in the open position.

98. (Previously Presented) The sprinkler assembly of claim 35, further including:
a rotary drive mechanism for the nozzle housing;
a manually adjustable arc setting mechanism for setting an arc of coverage for the sprinkler;
an actuator for moving the valve element between the open and closed positions, the actuator being so constructed that moving the valve element does not disturb an existing arc setting.

99. (Previously Presented) The sprinkler assembly of claim 98, further including a controller for moving the valve element, wherein the controller includes a gear, and a rotatable actuator coupled to the gear; and

wherein the valve element includes gear teeth around a circumference thereof which cooperate with the controller gear to move the valve element between the open position and the closed position when the actuator is rotated.

100. (Previously Presented) The sprinkler assembly according of claim 99, wherein the actuator is manually rotatable from the exterior of the nozzle housing.

101. (Previously Presented) The sprinkler assembly of claim 100, wherein the actuator is radially offset from a central axis of the nozzle housing.

102. (Previously Presented) The sprinkler assembly according to claim 35, wherein the conical valve element includes a curved interior passage having an upstream part which is axially aligned with the main portion of the nozzle flow path, and a downstream part which is axially aligned with the angled portion of the nozzle housing flow path, and in fluid communication therewith when the valve is open.

103. (Previously Presented) The sprinkler assembly according to claim 102, further including a flow guiding element in the downstream part of the curved passage.

104. (Previously Presented) The sprinkler assembly of claim 48, further including:
a rotary drive mechanism for the nozzle housing;
a manually adjustable arc setting mechanism for setting an arc of coverage for the sprinkler;
an actuator for moving the valve element between the open and closed positions,
the actuator being so constructed that moving the valve element does not disturb an existing arc setting.

105. (Previously Presented) The sprinkler assembly of claim 104, further including a controller for moving the valve element, wherein the controller includes a gear, and a rotatable actuator coupled to the gear; and

wherein the valve element includes gear teeth around a circumference thereof which cooperate with the controller gear to move the valve element between the open position and the closed position when the actuator is rotated.

106. (Previously Presented) The sprinkler assembly according of claim 105, wherein the actuator is manually rotatable from the exterior of the nozzle housing.

107. (Previously Presented) The sprinkler assembly of claim 105, wherein the actuator is radially offset from a central axis of the nozzle housing.

108. (Previously Presented) The sprinkler of claim 48, further comprising a controller for the valve,

the controller including a gear and a rotatable actuator coupled to the gear; and

wherein the valve includes gear teeth around a circumference thereof which cooperate with the gear to move the valve element between the open and closed positions when the actuator is rotated.

109. (Previously Presented) The sprinkler assembly according to claim 108, wherein the actuator is manually rotatable from the exterior of the nozzle housing.

110. (Previously Presented) The sprinkler assembly according to claim 48, wherein the valve element includes a curved interior passage having an upstream part which is substantially vertical and a downstream part which is axially aligned with the opening in the valve element.

111. (Previously Presented) The sprinkler assembly according to claim 110, further including a flow guiding element in the downstream part of the curved passage.

112. (Previously Presented) The sprinkler assembly according to claim 48, wherein the valve includes a curved interior passage having an upstream part which is axially aligned with the main portion of the nozzle flow path, and a downstream part which is axially aligned with the angled portion of the nozzle housing flow path, and in fluid communication therewith when the valve is open.

113. (Previously Presented) The sprinkler assembly according to claim 112, further including a flow guiding element in the downstream part of the curved passage.

114. (Currently Amended) A sprinkler assembly for receiving a supply of water and directing water therefrom, comprising:

a nozzle housing having a central axis and a flow path therein for water received in the sprinkler assembly,

the flow path having a main portion extending along the central axis of the nozzle housing and an angled portion defining a water stream outlet passage through which water flowing through the flow path exits the sprinkler assembly;

a nozzle removably mounted in the outlet passage for distributing water from the sprinkler assembly; and

a valve disposed in the nozzle housing including a valve element which is movable between open and closed positions to control water flow between the main and angled portions of the nozzle housing flow path,

the valve element being substantially conical in shape and having [[an]] a single opening formed in a conical wall thereof configured and positioned to align with the water stream outlet passage when the valve is in the open position.

115. (Previously Presented) A sprinkler assembly for receiving a supply of water and directing the water therefrom over a selected area comprising:

a nozzle housing having a main flow passage therein for receiving water from a supply source and an outlet passage through which water flowing in the main flow path exists the sprinkler assembly;

a rotary drive mechanism for the nozzle housing;

a manually adjustable arc setting mechanism on a center axis of the sprinkler assembly for setting an arc of coverage for the sprinkler;

a nozzle removably mounted in the outlet passage for distributing water from the sprinkler assembly; and

a valve disposed upstream of the nozzle for controlling flow of water to the nozzle, the valve being so constructed that it does not interfere with the center axis arc setting mechanism.

116. (Previously Presented) The sprinkler assembly of claim 115, wherein the actuator includes a gear, and a rotatable member coupled to the gear; and

wherein the valve element includes gear teeth around a circumference thereof coupled to the actuator gear to move the valve element between the open position and the closed position by the rotatable member.

117. (Previously Presented) The sprinkler assembly according of claim 116, wherein the actuator is manually rotatable from the exterior of the nozzle housing.

118. (Previously Presented) The sprinkler assembly of claim 117, wherein the rotatable member is radially offset from a central axis of the nozzle housing.

119. (Currently Amended) A sprinkler assembly comprising:

a nozzle housing having a flow path therein for water received in the sprinkler assembly, the flow path having a main portion extending along the central axis of the nozzle housing and an angled portion defining a water stream outlet passage through which water flowing through the flow path exits the sprinkler assembly;

a nozzle removably mounted in the outlet passage for distributing water from the sprinkler assembly;
and

a valve disposed in the nozzle housing including a substantially conical valve element rotatably mounted at a fixed axial position, and having [[an]] a single opening formed in a conical wall thereof,

the valve element single opening being movable into the flow path by rotation of the conical valve element between open and closed positions to control water flow between the main and angled portions of the nozzle housing flow path.

120. (New) The sprinkler assembly according to claim 35, further comprising:

a flow throttle and shut off controller including a gear, and a rotatable actuator coupled to the gear;
and

wherein the valve element includes gear teeth around a circumference thereof which cooperate with the controller gear to move the valve element between the open position and the closed position when the actuator is rotated.

121. (Previously Presented) The sprinkler assembly according to claim 35, wherein the valve is so constructed and configured that the parts thereof which control the flow when the valve is not in the fully open position are substantially completely displaced from the nozzle housing flow path when the valve is fully open.

122. (Previously Presented) The sprinkler assembly of claim 35, wherein the valve element is rotatably mounted in the nozzle housing to provide a sealing relationship with the water stream outlet.

123. (Previously Presented) The sprinkler assembly of claim 35, wherein the conical surface is oriented perpendicular to a longitudinal axis of the angled portion of the nozzle housing flow path whereby the axis of the opening is aligned with longitudinal axis of the angled portion of the nozzle housing flow path when the valve is in the open position.

124. (Previously Presented) The sprinkler assembly of claim 67, wherein the valve element is rotatably mounted in the nozzle housing to provide a sealing relationship with the water stream outlet.